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Electric propulsion fires over Pacific

by Ranney Adams, Propulsion directorate

EDWARDS AFB, CALIF. — A new space propulsion system was fired over the Pacific Ocean on March 15 for the first time by the Air Force.

The propulsion system being demonstrated is based on high-powered electric propulsion provided by a 26-kilowatt ammonia fueled arcjet. The demonstration is called the Electric Space Experiment, or ESEX.

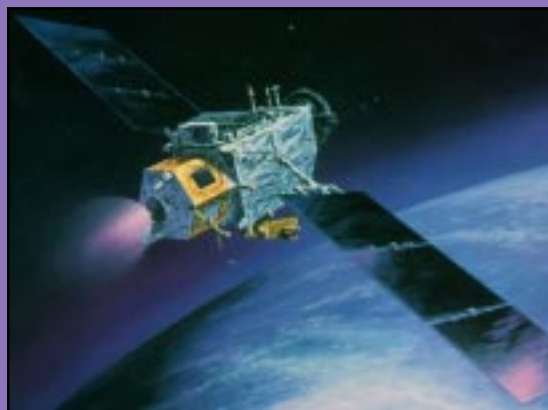
The emerging technology is an effort by the Air Force Research Laboratory's Propulsion directorate and TRW, the prime contractor for ESEX, to demon-

strate its use in space and evaluate its performance and interactions with other experiments on board an Air Force scientific satellite.

AFRL's project manager, Daron Bromaghin, notified lab personnel of the first successful test in space on the afternoon of March 15.

"The arcjet ran perfectly," Bromaghin said. "We fired for 141 seconds and quit only because we were running out of time on the pass over Hawaii. We were at full power at more than 27 kilowatts and everything worked great."

(SEE ESEX/P.3)



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SUCCESS IN SPACE — An artist's depiction of the ARGOS satellite firing an electric propulsion system. This depiction is similar to what scientists expected from the 26- kilowatt ammonia fueled arcjet as part of the Electric Space Experiment demonstration.

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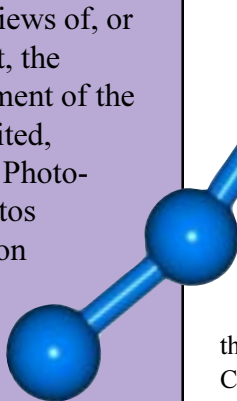
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<http://intra.afrl.af.mil/news/index>



President praises promise of AFOSR researchers

by Jean Schaefer, AFOSR

WASHINGTON, D.C.— On February 10, President Clinton named Air Force Office of Scientific Research researchers Dr. Daniel J. Blumenthal and Dr. Elizabeth Dickey among the 60 young researchers who receive the third annual Presidential Early Career Award for Scientists and Engineers. This is the highest honor a professional at the outset of their independent research careers can receive from the United States government.

Recipients of the award receive a five-year research grant to further their study in support of critical government missions. These awards were established by Clinton in February 1996 and embody the high priority the administration places on recognizing and nurturing the development of scientists.

Nine federal departments nominate scientists and engineers who will broadly advance science and technology that will be of the greatest benefit to these agencies. The participating agencies are: the Departments of Agriculture, Commerce, Defense, Energy, Health and Human Services, Veterans Affairs, the Environmental Protection Agency, the National Aeronautics and Space Administration and the National Science Foundation.

"These talented young men and women show exceptional potential for leadership at the frontiers of scientific knowledge," Clinton said. "Their passion for discovery will spark our can-do spirit of technological innovation and drive this nation forward to build a better America for the twenty-first century." @

Chemists corner cation; propulsion use predicted

by Ranney Adams, Propulsion directorate

EDWARDS AFB, CALIF. — Researchers at the Air Force Research Laboratory have achieved a breakthrough in polyatomic nitrogen chemistry that may allow future advances in high-energy rocket propellants or explosives.

The new discovery, which was announced on January 19 at the Winter Fluorine Conference of the Division of Fluorine Chemistry of the American Chemical Society, was made by Dr. Karl O. Christe and Dr. William W. Wilson of the AFRL Propulsion directorate. Led by Col. John R. Rogacki, the directorate is responsible for basic research, exploratory and advanced propulsion technology development.

Although nitrogen makes up 80 percent of the earth's atmosphere, polyatomic nitrogen molecules or ions, which
(SEE CATION/P.4)

Lab's Daniel named deputy assistant for science, technology

by Leah Bryant, AFRL headquarters

WRIGHT-PATTERSON AFB, OHIO — The Air Force announced recently that Dr. Donald C. Daniel is the new deputy assistant secretary for science, technology and engineering. Daniel will replace Dr. Helmut Hellwig, who has served as the deputy assistant since 1996. Prior to Hellwig's tenure, for four months in 1995, Daniel was the acting deputy assistant secretary for the office he will run and played a key role in setting it up.

As the new deputy assistant secretary, Daniel will be responsible for Air Force policy and investments in science and technology, as well as systems engineering (manufacturing technology and quality, standards, weapon system pollution and industrial base issues). He will also serve as the Air Force's senior technology executive in interactions with other services, the office of the Secretary of Defense and other agencies on a national and international level.

Daniel is currently the executive director for the Air Force Research Laboratory, headquartered at Wright-Patterson AFB, Ohio. Since 1997, he has been the laboratory's senior civilian executive for all aspects of the AFRL mission, responsible for the full spectrum of Air Force basic research, exploratory development and advanced development.

"This is really a challenging position," Daniel said. "These are difficult times but I'm going in with my eyes open. I think the Air Force has done a good job of getting me ready for the challenge. I also appreciate the excellent job that Dr. Hellwig has done the last three years during his tenure as the deputy assistant secretary. I will inherit a first-class organization from him.

"I've been fortunate through the years to have already worked with many of the current key players in the Pentagon. I look forward to working with them now on a daily basis.

"I think this is a good time for me to move to this new assignment. We've made it through the initial reorganization and stand-up of AFRL successfully. The senior people we have in our laboratory are an outstanding group of scientists, engineers and administrators. I'm confident AFRL will continue to do very well."

"We're going to miss Don's guidance greatly," Maj. Gen. Richard R. Paul, AFRL commander said.

"He's had a hand in selecting every one of our key senior civilians. Therefore, I know we have great people where we need them.

"In fact, Don's selection for this position is indicative of the overall quality of our folks. It's good news for the lab in many ways, including now having an 'insider' on the staff of the Secretary of the Air Force."

Daniel was a research engineer with the Boeing Company prior to beginning his Air Force career. At Boeing he conducted mission analyses and digital flight simulations for the Apollo and Saturn V manned lunar landing program under contract to NASA. In 1972, he joined the Armament Laboratory at Eglin AFB, Fla., where he enjoyed a variety of assignments with progressive responsibility, concluding as chief of the Advanced Guidance Division in 1988. During this time he was also a member of the adjunct faculty of the University of Florida's Graduate Engineering Center.

Later he served as chief scientist of the Arnold Engineering Development Center, the world's largest and most diverse complex for aerospace ground-testing. Daniel was the deputy director of science and technology, Headquarters Air Force Materiel Command, from late 1994 until early 1997.

A fellow of the American Institute of Aeronautics and Astronautics, Daniel's principal fields of technical expertise are aerodynamics and flight mechanics, areas in which he has authored or co-authored more than 40 publications. He is on the University of Florida's College of Engineering Advisory Council and the AIAA board of directors. He also serves as a U.S. national delegate for both NATO's Research and Technology Board and its Air Force Armaments Group. @



Dr. Donald C. Daniel

ESEX (from page 1)

The lab's electric propulsion researchers are gathering data at three different Air Force ground station sites while controlling the arcjet's space demonstration from the Air Force's Space and Missile Systems Center's space experiment control facility at Kirtland AFB, N.M.

Arcjet propulsion is based on creating a directed plasma in space. The simple system uses an anode/cathode design with a 26 kilowatt

potential between the elements. Ammonia gas is released to "spark" the arcjet and the resulting plasma uses the gases to super-expand and create thrust.

The experimental propulsion system is part of the launch payload of an Air Force scientific satellite called Advanced Research and Global Observation Satellite or ARGOS. A Delta II rocket launched the new space satellite propulsion experiment on February 23 from Vandenberg AFB, Calif. @

Sensors directorate wins award for technology transfer

by Leila Oliver, Sensors directorate

WRIGHT-PATTERSON AFB, OHIO — The Sensors Directorate of Air Force Research Laboratory recently received the 1999 Federal Laboratory Consortium's Award for Excellence in Technology Transfer for its work on heterojunction bipolar transistor (HBT) circuits for high reliability dual use applications.

This team, as members of the Aerospace Components and Subsystems Technology Division, has successfully transferred AFRL's patented thermally

shunted heterojunction bipolar transistor technology to industry, particularly Northrop-Grumman's Electronic Sensors and Systems Division. This technology has widespread applications for the Air Force and other military systems, such as phased array radar, electronic warfare and communications systems and for commercial applications such as wireless communications.

This team, an established center-of-excellence in the development of electron devices and the transfer of technology to

industry, has been especially active in microwave HBT research by developing and demonstrating a variety of improvements that included a breakthrough in HBT thermal management. The team shattered the world record for microwave power density and since that time, they have solved many problems that have historically plagued industry's HBTs.

The award was presented to the team at the 25th anniversary Federal Laboratory Consortium on April 21 in Salt Lake City, Utah. @

Cation (from page 2)

contain only nitrogen atoms, are rare. The interest in these compounds for propellants stems from their ability to provide energy through the production of nitrogen molecules.

In 1772, notable chemists of the time, Rutherford, Sceelee and Cavendish were able to isolate pure nitrogen from air. Only one polynitrogen compound, an azide anion, has ever been produced in bulk form. Curtius made this discovery in 1890.

The new discovery is a N_5^+ cation combined with the AsF_6^- anion or $N_5^+AsF_6^-$. Dr. Christie devised the synthesis of the compound and Dr. Wilson was able to produce macroscopic amounts of the compound with high yield and purity. Considering the cation's calculated heat of formation of 353kcal/mol, the white solid compound is surprisingly stable.

Dr. Christie and his fellow researchers envision additional molecules with greater stability and potential for the future. For example, the new cation may be combined with an energetic anion to yield a highly energetic propellant or explosive ingredients.

The discoverers are part of the Lab's High Energy Density Matter or HEDM team. Their efforts are devoted to finding and producing new, high-powered rocket propellants or additives that exceed current capabilities for use in future Air Force systems. HEDM research at the lab is partially supported by Dr. Mike Berman of Air Force Office of Scientific Research and by the Defense Advanced Research Projects Agency.

Using the power of the world's largest computers, team members can predict the properties of exotic yet-to-be-made compounds, while other scientists in the group make and test the



IN THE LAB — Dr. William W. Wilson (pictured) of AFRL's Propulsion directorate and his counterpart Karl O. Christie discovered a breakthrough in polyatomic nitrogen chemistry. Wilson produced macroscopic amounts of a new compound with high yield and purity.

new high-energy materials in the laboratory. Promising propellant candidates are then made in larger quantities and transitioned to the aerospace industry for additional evaluation.

Led by Dr. Pat Carrick, the lab's HEDM team acted to validate and verify all aspects of the new molecule. Dr. Jerry Boatz, Dr. Jeffrey Sheehy and Dr. Mario Fajardo provided important theoretical and spectroscopic data from lab tests. This data agreed with information from Alan Kersham at the University of Southern California and Dr. John Stanton at the University of Texas in Austin. Previous calculations made by Drs. Pyykkoe and Runeberg of the University of Helsinki, Finland were also utilized.

The team also collaborated with the Loker Hydrocarbon Research Institute and Chemistry Department at the University of Southern California. @

Seven join DLAMP ranks; best chosen

by Leah Bryant, AFRL Headquarters

WRIGHT PATTERSON AFB, OHIO, April 1, 1999 — The Air Force selected seven people from the Air Force Research Laboratory as candidates for the Defense Leadership and Management Program, or DLAMP.

The program provides training, education and development opportunities to prepare civilians for the challenges of leading and managing within the Defense Department.

The Air Force selection board met in late February and selected 42 primary candidates and 11 alternates. All of the AFRL selectees are primary candidates.

According to the chief of the Air Force Senior Executive Matters Office, Gregory den Herder, these candidates represent "the best the Air Force has to offer."

The AFRL selectees are: Harro Ackerman, Directed Energy directorate, Kirtland AFB, N.M.; Douglas L. Bowers, Wright Research Site, Wright-Patterson AFB, Ohio; Aaron D. Brinson, Munitions directorate, Eglin AFB, Fla.; Steven J. Mozes, Propulsion directorate, Wright-Patterson AFB; Joe Sciabica, Space Vehicles directorate, Kirtland AFB; L. Bruce Simpson, Munitions directorate, Eglin AFB; and John F. Tangney, Air Force Office of Scientific Research, Arlington, Va.

The Defense Leadership and Management Program is an outgrowth of a study by the Commission on Roles and Missions of the Armed Forces that recommended the development of a structured educational system for DOD civilians slated to assume key leadership positions. About 3,000 of these positions were identified within DOD and include almost 75 percent of its Senior Executive Service positions (general officer equivalents).

Once selected for DLAMP, participants must complete 10 graduate-level courses, in addition to occupation-specific ones, and professional military education courses. They will also participate in a 12-month rotational assignment designed to widen their expertise in, and knowledge of, Defense activities outside of their normal jobs.

To qualify for the program, the candidates had to be permanent, full-time civilian DOD employees in GS/GM-13, -14, -15 or equivalent positions and nominated by a DoD component. @



CARRYING ON TRADITION - Chester J. Maciag, an electronics engineer at the Air Force Research Laboratory Information directorate, briefs a group of Central New York high school students on technology programs at Rome, N.Y. Maciag was a student participant in the SITES program in 1986. (Air Force Photo by Albert Santacroce)

Mentor program meets future need

by Francis L. Crumb, Information directorate

ROME, N.Y. — With an eye toward meeting the manpower needs of today's explosion in technology, the Mohawk Valley Engineers Executive Council, or MVEEC, held its annual Student Introduction to Engineering and Science. The goal of the program was to acquaint high school students with engineering, science and technology by introducing them to the varied and rewarding careers in these fields.

Nearly 3,000 students from more than 40 schools in six central New York counties have participated in half-day on-site mentoring programs during the past quarter century. More than 70 area companies and organizations, including Air Force researchers have participated.

On March 25, 150 students joined mentors at workplaces across the region as the council celebrated the 25th anniversary of its annual project.

Chester J. Maciag, an electronics engineer at the Air Force Research Laboratory's Information directorate, is the current council chairman, with first-hand appreciation for the program. As a junior at Waterville Central School, Maciag was a student participant in March 1986 and was hosted at what was then the Rome Air Development Center. He pursued his interest in the field by earning a bachelor's degree in electrical engineering from Rochester Institute of Technology and returned as a full-time member of the Rome laboratory staff in 1991.

Maciag said, "More than a million new engineers, researchers and technicians are expected to be needed in the U.S. by 2005."

This year's event provided some of those aspiring minds with a first-hand opportunity to explore careers in engineering and science.

The MVEEC also honored both the AFRL and the New York State Department of Transportation for their contributions to the Project SITES program.

Representing the laboratory and serving as hosts to students were: Dr. Dan Benecasa, Carla Burns, Mike Decker, Rita Ellis, Mark Foresti, Lee Gallagher, Darren Haddad, Chet Maciag, John Russo, James Maier, Dr. Andy Noga, Lt. Vinod Noga, John Pletl, Nehemiah Robinson, Virginia Ross, Richard Simard, Lt. Gary Sunada, Dr. Stanley Wenndt and Joyce Williams. @

Commander's Corner



by Maj. Gen. Paul

Searching for answers? Tech Connect delivers

The past several weeks have been characterized by unpleasant subjects like budget offsets, manpower reductions and the accompanying turbulence. So, for this Commander's Corner, I'd like to turn back to our bread-and-butter; technology. One question I often get is, "How does an 'outsider' find the answer to a technical question within your huge, geographically dispersed organization?"

We operate a 24-hour hotline that has been an invaluable service for almost six years now, which we call "Tech Connect." From the maintainer on the flight line to overseas logistics directors, the Tech Connect team has provided easy access to Air Force technology and found information quickly for our customers. Our customers report they save an average of 61 hours each time they use the service for searches. In fact, since mid-1993, the hotline has averaged 1,300 requests a year. Of these, 38 percent have come from DOD; 26 percent of the Air Force requests have come from within AFRL.

The Tech Connect team relies upon the expertise of scientists and engineers in the laboratory's technology directorates who may have novel solutions to answer their customer's needs. Tech Connect also provides

assistance to scientists and engineers in the lab.

For example, before one of the directorates starts a new effort, the Tech Connect team can search Department of Defense and industry databases to determine if similar research and development is already being done.

Another useful aspect of the Tech Connect service is its electronic correspondence with Army, Navy and Air Force technology experts through TriNET, an informational e-mail network. This DoD network can be used to quickly find current information and experts in science and technology areas that might be difficult to find using traditional research methods.

For instance, an Information directorate lieutenant was searching recently for literature on data embedded in digital media. Using TriNET, a Tech Connect analyst was able to find an expert at the Army Research Laboratory who could help.

They also work requests from the other DoD services: A request came in from the Naval Oceanographic Office at the Stennis Space Center in Mississippi for information on sensors to help government personnel search ships for contraband. An analyst received responses from agencies such as the Army Corps of Engineers, Defense Advanced Research Projects Agency, and AFRL. In this case, the customer said that Tech Connect saved him three to four days in research time. What a great force multiplier!

Besides TriNET, the team also searches other databases and has strong ties to our technology transfer effort. They often contact the Office of Research and Technology Applications (ORTA) focal points in their search for answers because the ORTAs are very knowledgeable about the work being done at their specific facility or base.

The lab's wartime mission is to help warfighters find technology solutions to enhance field capabilities. The Tech Connect team puts the

warfighters in direct contact with lab technical experts with solutions for their immediate needs. During a military contingency, the hotline goes into 24-hour operations, seven days a week and we augment our staff with Air Force reservists to provide answers rapidly.

For instance, one Friday during a recent training week, the reservists received a request from the USAF Safety Center at Kirtland AFB, N.M., for aid in locating a downed U.S. military helicopter and crew. The crash site was in dense forest in eastern Tennessee. Because of these conditions, the Air Force rescue aircraft could not establish radio contact, nor could they visually spot the wreckage or crew from the air. Within an hour, the Tech Connect reservists identified 10 aircraft and systems within DoD and the commercial sector. The reservists then acted as liaisons between these organizations and the center during the first hours of the rescue effort and provided almost hourly support over the remainder of the weekend.

If you have any questions or requests, please contact any of the Tech Connect analysts:

- SMSgt Dale Neidigh, team leader, DSN 785-3897, dale.neidigh@afrl.af.mil;
 - Becky Gentry, research analyst, DSN 986-9056, becky.gentry@afrl.af.mil;
 - Kim Hurd, research analyst, DSN 785-3884, kim.hurd@afrl.af.mil;
 - Linda Bassham, research analyst, DSN 986-9054, linda.bassham@afrl.af.mil.
- Call our hotline at (800) 203-6451 (DSN 986-9030), send e-mail to a team member above or to aftecon@afrl.af.mil. @

Columns

Columns

PA Pointers

Giving the news that's fit to print

Mark Twain once said, "It is better to say nothing and be thought a fool than to open your mouth and remove all doubt." Few of us have pen names, as Twain (really Samuel Clemens) did, to accept the blame for any speculative statements we make in response to questions from the media. To avoid the pitfalls of saying something "foolish," the Air Force Research Laboratory has created a network of Public Affairs representatives to answer the questions of its members regarding interaction with the media, public relations or marketing representatives.

These representatives can assist you in determining what course of action to pursue when answering queries, locating points of contact and clearing items for release.

Here are a few points to keep in mind while dealing with the media:

- Air Force members should refer all media inquiries to a PA representative and not speak in an official capacity to the media before prior coordination with PA. Media representatives may interpret any communication between themselves and members of the Air Force as "on the record" or official information. (Technology directorate personnel should refer the media to their internal Public Affairs office, if one exists, or to the host unit or local servicing PA office. Employees of the AFRL headquarters should refer media calls to Maj. Ginger Jabour, (937) 656-9876, or Leah Bryant, (937) 656-9010.)

- This also applies to calls from public relations or marketing representatives who are seeking endorsements for their products or activities. For instance, if you're called by a software company for an impromptu survey about their product and how it has helped your Air Force organization, refer the caller to a PA representative. By AFI 35-206, Air Force members must not endorse commercial products, services or activities, either directly or by implication.

- Keep in mind, too, that any statements you post to Internet discussion groups or send through e-mail that include your duty title, phone number or unit (in a footer, for example) or that are sent from government systems (with e-mail return address displaying an "af.mil" extension, for example) could potentially reach a media representative. Someday, you may see a *USA Today* headline that reads: "Air Force astrophysics expert comments online about 'little green men' and their outstanding landscaping job on Mars." In any event, by AFI 33-129, Para. 6.1.6, Air Force members are prohibited from participating in "chat lines" or open forum discussion unless for official purposes and after approval by appropriate PA channels.

- Should you be the point of contact for an event that requires media coverage (newspaper, TV, radio, photographer, magazine, press releases, etc.), contact a PA representative early in the set-up process to assist you. Some events that may fall into this category are: public events involving Maj. Gen. Paul or front office personnel; any event that would showcase the AFRL in the public eye; and, outside briefings (especially at the Pentagon or outside the Air Force). PA also offers guidance on briefings, brochures, videos, newspaper articles, displays, conferences, fact sheets, etc.

The basis of journalism these days is producing headlines against daily, even hourly, deadlines. The pressure to meet these deadlines, coupled with a human nature that thirsts for an easy answer, may lead to distributing false information for the sake of supplying information quickly and easily. In order that you, as representatives of the Air Force, communicate reliable information to the public through media channels, it is important to seek the counsel of PA specialists. @



@columns

HR Corner

Lab personnel demonstration results encouraging

The Air Force Laboratory Personnel Demonstration program is one of our newest internal initiatives. Designed to create and maintain a top quality and highly motivated workforce that can be responsive to rapidly changing needs, the Lab Demo program's results to date have been very positive. Keep in mind that it is the men and women of the Air Force Research Laboratory who enable us to deliver on our commitment to "discover, develop, integrate and deliver affordable technologies for improved warfighting capabilities." As such, top priority has been given to this new way of managing our scientists and engineers. While Lab Demo is no panacea, there are definite signs that it is moving our workforce and our culture in the right direction.

Our leadership is excited about the results coming from the second cycle of the Lab Demo Contribution-based Compensation System, or CCS. The system is clearly allowing us to get the maximum bang for our salary buck.

A detailed briefing providing many statistics resulting from the second cycle CCS is posted on the Lab Demo home page at <http://www.aftech.afrl.af.mil/personnel-demo/index.htm>. While this column won't go through them all, here are a few that point out the benefits of the new system.

Our top contributors, and the future leaders of our Laboratory, were justifiably rewarded this past cycle. Of the 2,531 civilian scientists and engineers assessed under the system, 188, or 7.4 percent, received an incentive increase (not including the general increase or locality increase) of 6 percent or greater, which equates to the salary increase associated with a promotion under the old system. Twenty-six of these received incentive increases over 10 percent, the largest was 18.1 percent. We also advanced 114 employees to higher broadband levels; 76 of them to the high-grade region of broadband level 3. Despite this large number of new high-grade employees, we were unable to advance all of the deserving employees to DR-IIIs. But, due to a special provision in the CCS design, we were able to pay out over \$217,000 in bonuses to those DR-II employees capped by externally imposed high-grade controls.

We have also put a stop to salary increases for those employees who are not contributing at a level commensurate with their current level of pay. All salary increases, except locality increases, were withheld from the 43 employees assessed above the upper rail, in the Automatic Attention Zone, or AAZ.

It is interesting to note that eleven of the AAZ employees from the first cycle progressed from above the upper rail to below the Standard Pay Line this year. This is a clear indication that CCS can truly motivate employees and provides much needed feedback and developmental opportunities.

Some people believe CCS is an attempt by AFRL management to make all employees "generalists" and that there is no room for "technical specialization" in AFRL. This is not the case. Instead, CCS is designed to identify and reward the employee's level of contribution. This happens not only by identifying the job successfully performed by the employee, but more importantly by the results associated with it. Some employees contribute at a high level in all six factors. These are our present and future leaders, and CCS will reward them with the highest pay and broadband level advancements. Others may excel in some, but not all, factors, either by choosing very narrowly focused activities or because of less well-rounded capabilities. These employees are indispensable to our mission and can also expect to be rewarded by CCS, although not to the same pay or broadband level as a managerial or technical leader. The six factors and their associated descriptors are the roadmap employees need to focus on the "total job" and progress into leadership roles but not all employees aspire to leadership positions. It is a matter of personal choice and ability.

We have touched on only a few highlights from the second CCS cycle. Hopefully, we have provided some additional insight into CCS and how it will play an integral part in the future of AFRL. @



@Columns

CIO Topics

Meeting the challenges of Y2K



We are at the welcome mat of the new millennium and are facing a troublesome problem that some say threatens to cripple existing technology. The Air Force Research Laboratory is carefully planning for the new century and working to meet system and software challenges that may result from the Year 2000 "bug," also known as the Y2K problem.

The Y2K problem is a result of programming practices from the early days of computers involving the use of six-digit dates, dd/mm/yy, versus eight-digit dates, dd/mm/yyyy. This results in the possibility of a date such as "11/11/31" being interpreted by a computer as November 11, 1931, instead of November 11, 2031. Any computer program that deals with six-digit dates may be susceptible to the Y2K problem.

Another problem involved in the Y2K issue is date mathematics. For years, businesses have used this method to track things such as aging schedules, due dates, past due accounts, etc. Many applications now use date mathematics. These applications use a base year, often January 1, 1900, as the starting point for tracking date and time.

For example, a computer program would calculate the difference between January 1, 1998, and January 1, 1999, as 365 days. Calculating the difference between today and when a bill was incurred would tell you how old a bill was (i.e., 30 days). Since computers usually use the six-digit date system, a situation like 12/08/99 through 01/01/00 might be misinterpreted by the computer system as December 8, 1999, through January 1, 1900. The calculation would result in a large negative number (in the tens of thousands). This may or may not be a problem that the computer program can deal with.

It is possible that this resulting number would also be made into an absolute value, which drops the negative sign if no space is reserved to hold it, causing even more confusion. Imagine if your debt went from 23 days old to 36,114 days!

The second type of Y2K problem involves systems that check to determine if a valid date is used. For example, a security system may check to see if today's date is valid before recording an entry or exit from the building. If the "00" date is determined to be out of range, i.e. occurred 100 years ago, the system would shut down and lock the doors.

Our lab-wide Y2K program has been recognized as one of the best in the Air Force and Department of Defense. Every computer resource and piece of software nestled deep inside AFRL systems has been assessed for compliance. Only 13 percent of AFRL's hardware and software remain non-compliant. We are continuing to eliminate problems with non-compliant technologies daily by installing the appropriate "fixes" that will ensure these systems continue to work without problems when we step off the welcome mat and into the next century.

One of three things will happen to items that are found non-compliant:

1. They will be fixed – updated chips installed or software patches applied once the vendors make the solutions available;
2. They will be replaced – new items will be bought, or;
3. They will be reset – the system clock can be reset after January 1, 2000, and the system will continue to operate as before. @

Info about INFOCON

In the wake of virus attacks by "Melissa," "Happy '99," etc., it is important to recognize that while people once went off to war, modern science can bring it to our doorstep.

In the event that you receive a virus message, contact your Computer Systems Security Officer or your systems administrator.

In response to this new threat, Information Operations Conditions have been established for AFRL. The INFOCON recommends actions to uniformly heighten or reduce our defensive posture, to defend against computer network attacks and to buffer the harmful effects of sustained damage to the DOD information infrastructure (computer and telecommunication networks and systems).

Each INFOCON level reflects a defensive posture based on the risk of impact to military operations through the intentional disruption of friendly information systems. INFOCON levels are Normal (day-to-day activity), Alpha (increased risk of attack), Bravo (specific risk of attack), Charlie (limited attack), and Delta (general attack). Each level has a list of preventative actions, actions to be taken during an actual attack, and damage control/mitigating actions.

Your Information Technology staff will distribute a list of actions to take when confronted with these INFOCON levels. Though prematurely linking actual actions to levels is classified, we are currently at INFOCON BRAVO.

TD Spotlight-- Air Force Office of Scientific Research

by Jean Schaefer, Air Force Office of Scientific Research

ARLINGTON, Va. — Much like venture capitalists who seek to uncover small companies that will grow into Fortune 500 companies, the Air Force Office of Scientific Research seeks to discover the technologies and knowledge needed for the next generation of weapon systems.

Located in Arlington, Va., AFOSR manages the Air Force Research Laboratory's entire investment in basic research and focuses the efforts of researchers on Air Force relevant technologies. Those researchers, from academia, industry, AFRL's other technology directorates and other government agencies, seek to discover and exploit breakthroughs in science.

Each year, AFOSR invests in long-term, broad-based research in aerospace-related science and engineering through grants and contracts to academic institutions and industry, as well as intramural research within AFRL. Its annual budget includes about \$209 million in Air Force funding and about \$100 million in other additional funding.

Those grants and contracts are awarded to some of the top researchers and those who hold the most promise in developing new technologies. Throughout its history, AFOSR has been successful in directing talented researchers toward Air Force relevant research.

Among AFOSR's present and past researchers, there are 35 Nobel Prize winners who received AFOSR support prior to winning and six winners who received AFOSR support after winning the Nobel Prize.

Located near the National Science Foundation and the Office of Naval Research, AFOSR is organized into five major scientific thrusts and an international office.

The five scientific areas are:

- Aerospace and Materials Sciences -- focuses on solid mechanics and structures, fluid mechanics, propulsion and materials;
- Physics and Electronics -- manages research investments in lasers, plasmas, atomic physics, semiconductors, superconductors, optical computing;
- Chemistry and Life Sciences -- directs research to increase weapon systems and warfighter performance in materials, energetics, force readiness and environmental protection;
- Mathematics and Space Sciences -- leads research into computational mathematics, electronic prototyping, sensor fusion, dynamical systems, signal processing, imaging, and terrestrial, atmospheric and space sciences; and
- External Programs and Resources Interface -- manages the Office of the Secretary of Defense, Defense Advanced Research Projects Agency, Ballistic Missile Defense Office and other programs relevant to the Air Force. These program managers also manage the Engineering and Scientist Exchange programs for AFRL and other programs designed to stimulate scientific and engineering education benefiting the Air Force.

The AFOSR also gains access to international research and research organizations through its offices in Tokyo and

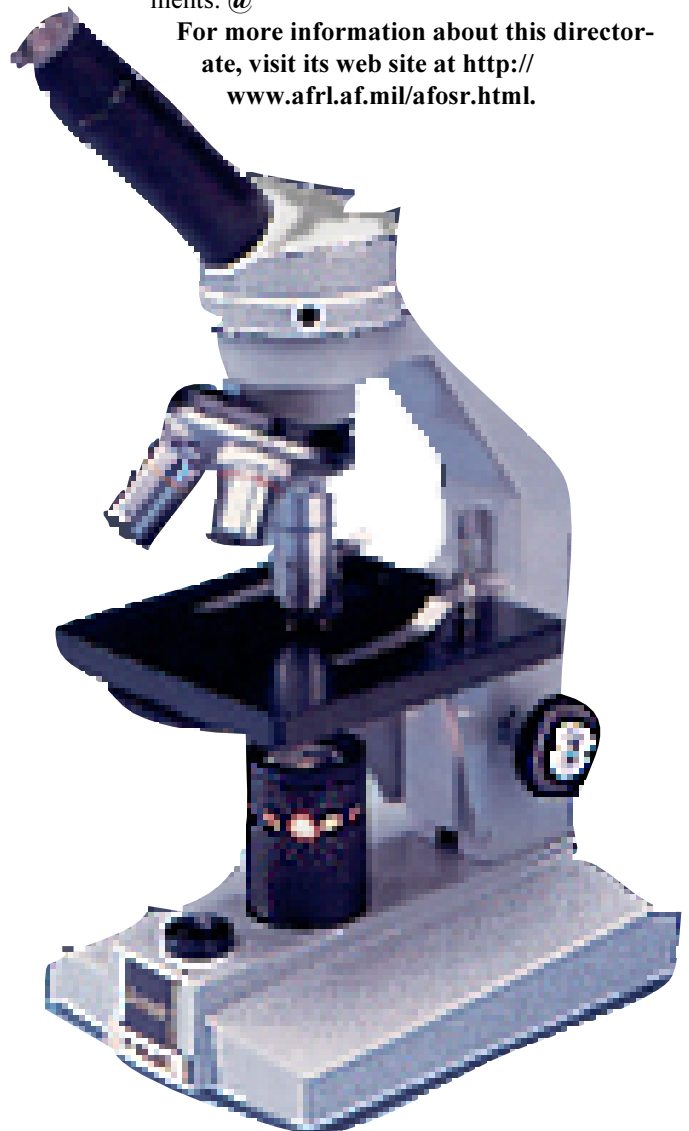
London.

The five scientific directorates manage programs supporting about 40 major research areas. The External Programs and Resources Interface manages several programs that increase the capabilities of universities to conduct scientific research and educate scientists and engineers. Among those programs are:

- Defense University Research Instrumentation Program
- Defense Experimental Program to Stimulate Competitive Research
- National Defense Scientist and Engineer Graduate Fellowship Program
- USAF National Research Council Resident Research Associateship Program

AFOSR also manages scientist and engineer exchange programs under government-to-government agreements. @

For more information about this directorate, visit its web site at <http://www.afrl.af.mil/afosr.html>.



Net Index

Due to the number of submissions we receive, some sections of *news@afrl* are available exclusively on-line. The on-line version of the newsletter allows users to view the AFRL corporate calendar, news releases generated by AFRL headquarters, operating instructions, L@b L@urels and Roundups sections.

The L@b L@urels section of the electronic newsletter is dedicated to members of Air Force Research Laboratory who receive awards and honors. The Roundups section of the electronic newsletter keeps Air Force Research Laboratory employees informed about contracts AFRL has awarded. Below is an index of articles one can find in each of these on-line sections.

L@b L@urels

- Space staffers receive awards for excellence
- Schlossberg cited for leadership and focus



Joseph L. Gottschlich

- Gottschlich wins award for "QwikBoost"

- Dr. Won S. Chang named ASME Fellow

- Nelson nominated for engineering fellowship "IDEA" earns employee \$5,400 award

- Interns receive award and scholarship; success partially due to lab program

- Weinstock receives degree for work with SQUID

- Rivir selected as one of areas outstanding scientists and engineers for 1999

- Air Vehicles directorate honors this year's best



Margaret "Peggy" Ann Shea

- AFRL's Shea receives W. E. Smith medal

- Former commander finds new leadership role in Aeronautical Systems Center

- Director of aerospace and materials area named

- Five recognized by Dayton ASC chapter

Roundups

- Geometrix picks up contract for 3-D terrain modeling

- Research Laboratory awards contracts under DARPA program

- Directorate to protect networks with IET contract

- Marcy wins contract to improve radar performance

- Contract awarded for system to study computer crime

To view the full text of these and other articles visit the *news@afrl* page on the Internet.

To submit L@b L@urels or Roundups from your directorate, send a query to:

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